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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,890	02/27/2004	Klaus Florian Schuegraf	303.278US2	9295
21186	7590	06/15/2005		
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A. P.O. BOX 2938 MINNEAPOLIS, MN 55402-0938			EXAMINER LEE, CALVIN	
			ART UNIT 2818	PAPER NUMBER
DATE MAILED: 06/15/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary

Application No.

10/789,890

Applicant(s)

SCHUEGRAF et al.

Examiner

Lee, Calvin

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/25/05 (amendment).
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 23-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 23-64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

OFFICE ACTION

Response to Amendment

1. The cancellation of claims 13-22 and the amendment of claim 11, 41, 47, 59, received on May 25, 2005, are acknowledged.

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 1-3, 5, 6, 8-11, 13-22, 25, 27-29, 31, 33-35, 38, 39, 41, 44, 46, 47, 50, 52, 53, 56, 58, 59, 62, and 64 are rejected under 35 U.S.C. 102(e) as anticipated by *Pan* (US 5,739,066).

Pan discloses a method of forming a structure for controlling current flow between a source/drain region in a semiconductor device, wherein the semiconductor device is composed of a semiconductor wafer layer, an insulating layer disposed over the semiconductor layer, and a conductive layer disposed over the insulating layer, the method comprising:

-forming a gate stack (poly-Si 24, refractory metal 26, SiN cap 30) having sidewalls exposing its conductive layers and some portion of its insulating layer [Fig. 2 and col. 3, ln.5]

-forming on the gate stack a first barrier spacer 34, 36 of SiN by oxidation [Fig. 3]

-reoxidizing the structure to form a smiling effect at the boundary between the gate stack and the S/D region [Fig. 8 and col. 3, ln.41 thru col. 4, ln.5]

-forming on the first barrier spacer another oxidation barrier 40, 42 of a nitride containing material

-further forming a smile effect with the later of reoxidation (in another preferred aspect, col. 4)

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4, 7, 12, 26, 30, 32, 36, 37, 40, 42, 45, 48, 51, 54, 57, 60, and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Pan* in view of *Hurley* (US 6,350,780).

a) *Pan* is silent about incubation time. *Hurley* discloses “using the predeposition of silicon, an incubation time for the start of silicon nitride nucleation at the electrode surface is decreased relative to the incubation time for the start of silicon nitride nucleation when silicon nitride is deposited without predeposition of silicon on the electrode surface ... deposition of silicon nitride on each of these surfaces also includes an incubation time at the start of the deposition where there is no apparent deposition of silicon nitride” [col. 2].

It would have been obvious to a person of ordinary skill in the art to have modified the process of *Pan* by utilizing an incubation time because the well-known incubation time varies depending on the material of a depositing layer and/or the conditions of a layer deposition.

b) In re claims 26, 30, 36, 40, 45, 51, 57, and 63, *Pan* discloses selectively depositing the first SiN spacer at a temperature of about 300-900°C, but is silent about pressure and flow rate. *Hurley* suggests “method for deposition of the SiN ... preferred conditions: a temperature of 650-800°C, a pressure of 50-700mTorr, and a flow ratio of 3:1 to about 10:1” [col. 4].

It would have been an obvious matter of design choice to modify the spacer formation of *Pan* by utilizing claimed deposition pressure and flow ratio, since such a modification would have involved a mere change in the value of those temperature, pressure and flow ratio.

6. Claims 23, 32, 37, 42, 48, 54, 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Pan* in view of *Hurley* and further in view of *Woo et al* (US 4,774,201).

The combination of *Pan et al* and *Hurley* does not suggest the layer of reoxidation being formed by a polycide reoxidation. *Woo et al* discloses a silicide reoxidation technique, where a “CVD oxide layer operates to slow the passage of oxygen atoms to combine with the tungsten atoms of the silicide layer but allows free migration of silicon atoms from the polysilicon layer to the tungsten silicide surface and combine with the oxygen atoms” [Abstract].

It would have been obvious to a person of ordinary skill in the art to have modified the reoxidation of *Pan* by utilizing a silicide reoxidation for the purpose of forming an uncontaminated reoxidation layer without the requirement of a substantially pure N ambient.

7. Claims 24, 33, 38, 43, 49, 55, and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Pan* in view of *Liao et al* (US 5,480,830).

Pan suggests conductive layer 24 being a poly-Si but not an undoped silicon. *Liao et al* teaches a gate electrode comprising an undoped silicon [col. 2, ln.16].

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a gate electrode comprising undoped silicon in *Pan* 's device in order to use the device in an application, which requires high operating voltages.

Response to Arguments

8. Applicant's arguments with respect to pending claims 1-12 and 23-64 are persuasive. After a closer review of the applicants' arguments, dated May 25, 2005 and after further search related arts, the examiner has found another reference, US 5,739,066 to *Pan*, which would read on the pending claims. Therefore, above is a new ground of rejections.

Contact Information

9. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 from 7:00AM to 5:00PM (Monday-Thursday, Eastern Time). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *David C. Nelms* can be reached at (571) 272-1787.

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The central fax number is (703) 872-9306 for all communications to be entered (e.g., amendments, remarks, IDS, etc.)



Dated: June 9, 2005


David Nelms
Supervisory Patent Examiner
Technology Center 2800